
REVISITING SERVICE QUALITY METRICS & ITS APPLICATIONS IN INDIAN SCENARIO

¹Surjit Kumar Gandhi, ²Anish Sachdeva, ³Ajay Gupta
^{1,2,3}Department of Industrial and Production Engineering
 Dr. B. R. Ambedkar National Institute of Technology,
 Jalandhar-144 011, Punjab, India.

Email: surjeet.ip.13@nitj.ac.in, asachdeva@nitj.ac.in, guptaa@nitj.ac.in

Abstract

Service quality is the overall impression of relative superiority or inferiority of the organization and its services to the consumers. This study explores the evolution and development of service quality concept in the Indian setting through an appraisal of 24 landmark models relevant to both manufacturing and service organizations. The main objective of this paper is to highlight the evolution, development and current status of service quality concept and its measurement models proposed in the Indian context in an ontological manner and carry out a critically examination stating limitations thereof. The paper aims to bring out a new standardized yardstick for measuring service quality befitting for Indian industrial organizations, if possible. The article may appeal to new researchers in India or other emerging economies since it not only brings out the latest trends in service quality measurement, but also offers valuable help and directions to researchers and practitioners working in the area of service quality improvement.

Keywords: Service Quality, FAIRSERV, SERVDIV, E-S-QUAL, EduQual

1. Introduction

Service quality may be defined as the gap between customer's expectation and perception (Parasuraman *et al.*, 1985). Service quality has been the subject of keen interest and debate in academic and business context as organizations have increasingly paid more interest to the quality of services delivered to the customers (Trehan *et al.*, 2004). Over the past three decades or so, a number of service-specific models of service quality have been presented by the researchers. Upon summarizing the available studies for measurement of service quality in Indian setting, it is revealed that mainly two types of tools have been presented- theoretical and empirical/application based. Seth *et al.* (2006a) undertook a comprehensive analysis of key issues concerning 19 such metrics developed over a period from 1984 to 2006. New breakthroughs have occurred in the understanding and measurement of service quality since then. The present paper attempts to examine 24 popular service quality models applicable in diverse fields in the light of ever changing products and services scenario in Indian context and appraises whether one standardized model can suffice all purposes.

2. Service Quality from a Multi-Disciplinary Perspective

In IEEE Case workshop held in August 2009, the presentation of IBM Corporation summarized the following multi-disciplinary perspectives of Service Quality:



Economics perspective views Service Quality as a profitable investment made to reap benefits for the whole value chain.

- **Marketing perspective** views it as a win-win situation at every interface leading to satisfaction and loyalty.
- **Operational perspective** guides the managers towards process discipline thus enhancing the system efficiency.
- **Behavioural perspective** suggests the pleasing behaviour on the part of service delivery personnel which positively impacts customer behaviour, WOM (word-of-mouth) and intentions.
- **Servicescape perspective** indicates that a pleasant Service climate of service unit/workplace affects Service Quality.

Singh *et al.* (2011) have suggested that service quality in its conceptual context relates to:

- i. **Objective/Manufacturing/Conformance based (Technical perspective)** – The product or service must meet some pre-determined standardized technical specifications promised by the provider, with no deviations permitted, as in “zero-defect” policy used in mass production system.
- ii. **Subjective/Perception/User’s Opinion based (Functional perspective)** – Service Quality is to be decided by the customer based on his/her “moment of truth” during interaction with the organization even if all technical yardsticks are satisfied.

This paper is focussed largely on the user’s opinion based perspective of service quality.

3. Stages of Service Quality Evolution

Quality was introduced in the service marketing literature at the beginning of the 1980s (Grönroos, 1993). In India, research in service quality has passed through three main stages. In the first stage, researchers depended on the disconfirmation paradigm models (i.e. Parasuraman *et al.*, 1988) as a foundation for measurement of service quality. This was followed by the second stage where the outputs of the first stage (static models) were used in developing alternate measurement models of service quality such as LIBQUAL, EDUSERV, and SERVDIV. The third stage was concerned with developing dynamic models representing multidimensional hierarchical structures, and refining the measurement models. Each of the three stages is discussed below.

First stage (1998-2005): The service quality concept was developed because service characteristics did not seem to fit the characteristic of physical goods. Therefore, instead of using quality concepts from manufacturing, service marketing researchers built their studies on developing a service quality concept on models from consumer behaviour. The service sector is a potentially fruitful domain for expanding previous theoretical developments in consumer behaviour. According to some models of consumer behaviour, the customers’ post-purchase perception of a product is a function of the prior purchase expectations. This notion formed the basis of the widely used disconfirmation concept of service quality. As suggested in the literature on service quality, the quality perception depends on the degree to which quality expectations are confirmed or disconfirmed by the customer’s experience of a given service. Based on the disconfirmation paradigm, a number of Indian scholars developed a group of models which can be described as static models. These models describe the variables and contexts which have to be considered when attempting to understand how

service quality is perceived and how it should be managed. Eight such models selected for this study are, the perceived service quality model of Customer service index model (Sinha & Babu, 1998); Retail banking model (Madhukar *et al.*, 1999); Gap model in steel Industry (Sinha & Ghosal, 1999); Total Quality Service (TQS) model (Sureshchander *et al.*, 2001); Lib-Qual Model (Banwet & Datta, 2002); Multi-country cross-culture model (Malhotra *et al.*, 2005); Service sector SERVQUAL Model (Banerji *et al.*, 2005); and comparative approaches model (Mukharjee and Nath, 2005).

Second stage (2006-2011): Both academicians and practitioners stressed the importance of measuring, monitoring, thus enhancing service quality. As a result, the second phase aimed to develop measurement models built on the static models of the previous stage. Though there seems little doubt that during these years too, SERVQUAL (developed by Parasuraman *et al.* 1988) has proved to be the most popular instrument for measuring service quality. However, many researchers (e.g., Seth *et al.*, 2006b; Palani Raja, 2007; Prakash, 2011; Kelkar, 2010) have questioned some aspects such as its validity and generalizability. Additionally, it was criticized because of the problems associated with customers' expectations. As a result, another measure of service quality SERVPERF (Cronin and Taylor, 1992) was used more frequently. Linkages of service quality to customer satisfaction, loyalty, commitment, trust and competitive advantage were developed in this phase (Ghosh and Srivastava, 2009; Seth *et al.*, 2006b; and Prakash, 2011). Eight models which made significant contributions for modelling and development of service evaluation in this phase are selected for this study viz., Service Quality in manufacturing supply chains (Seth *et al.*, 2006b); Edu-QUAL model (Mahapatra and Khan, 2007); Healthcare service quality (Palani Raja *et al.*, 2007); Commitment and Trust based Service Quality model (Ghosh and Srivastava, 2009); SERVDIV model (Kelkar, 2010); Gap Model of service quality in Life Insurance Industry (Siddiqui and Sharma, 2010); Service Quality in Automotive Industry (Prakash, 2011); and Service quality model for Life Insurance Business (Prakash *et al.*, 2011).

Third stage (2012-onwards): According to Grönroos (1993), since services are processes and thus dynamic phenomena, every attempt to develop a measurement model based on the static model (of the first stage) has its limitations. Also, Gummesson (1992) suggested, this is true for all social phenomena where concepts are always elusive. The directions of this stage, as suggested are twofold: The first, in the short term, is developing valid approximation and deviations from the disconfirmation concept. The second, in the long run, is developing dynamic models of service quality. Finally, it seems, the confirmation/disconfirmation concept probably has to be replaced (Gupta and Singh, 2015). Eight more dynamic and salient models covering a wider range of applications than earlier phases are selected to comprehend this phase viz.: E-Governance model (Mukhopadhyay and Chatterjee, 2012); Service quality at Indian railway stations (Gupta and Datta, 2012); Service Quality in Technical Education (Jain *et al.*, 2013); Service quality in Management Education (Sharma and Kaushal, 2014); Bus Service Quality Model (Das and Pandit, 2015); Outcome Service Quality model (Jain and Jain, 2015); Service quality in Indian banks (Pandit and Balyan, 2016); and System approach to Service Quality model (Gupta and Singh, 2017)

3. Service Quality Metrics Adopted in Indian Applications

Though the researchers and practitioners took note of the concept of service quality in the late 90s in India, there is no dearth of research carried on the concept in last two decades or so.

The paper selects 24 landmark service quality studies which took place in India in diverse fields under continuously evolving business environment and identifies the best suited model for measuring service quality. Each model is analyzed through the major observations made by these models and the limitations outlined. This section further evaluates each of the models with regard to various factors.

The following models have been selected from the marketing literature:

- SQ 01. Consumer service Index model (Sinha and Babu, 1998)
- SQ 02. Retail bank service quality model (Madhukar *et al.*, 1999)
- SQ 03. Gap model in steel Industry (Sinha and Ghosal, 1999)
- SQ 04. Total Quality Service model (Sureshchander *et al.*, 2001)
- SQ 05. Lib-Qual Model (Banwet & Datta, 2002)
- SQ 06. Multi-country cross-culture model (Malhotra *et al.*, 2005)
- SQ 07. Service sector SERVQUAL Model (Banerji *et al.*, 2005)
- SQ 08. Comparative approaches to service quality (Mukharjee and Nath (2005)
- SQ 09. Service Quality in manufacturing supply chains (Seth *et al.*, 2006b)
- SQ 10. Edu-QUAL model (Mahaputra and Khan, 2007)
- SQ 11. Healthcare service quality (Palani Raja *et al.*, 2007)
- SQ 12. Commitment and Trust based Service Quality model (Ghosh and Srivastava, 2009)
- SQ 13. SERVDIV model (Kelkar, 2010)
- SQ 14. Gap Model of service quality in Life Insurance Industry (Siddiqui and Sharma, 2010)
- SQ 15. Service Quality in Automotive Industry (Prakash, 2011)
- SQ 16. Service quality model for Life Insurance Business (Prakash *et al.*, 2011)
- SQ 17. E-Governance Model (Mukhopadhyay and Chatterjee, 2012)
- SQ 18. Service quality at Indian railway stations (Gupta and Datta, 2012)
- SQ 19. Service Quality in Technical Education (Jain *et al.*, 2013)
- SQ 20. Service quality in Management Education (Sharma and Kaushal, 2014)
- SQ 21. Bus Service Quality Model (Das and Pandit, 2015)
- SQ 22. Outcome Service Quality model (Jain and Jain, 2015)
- SQ 23. Service quality in Indian banks (Pandit and Balyan, 2016)
- SQ 24. System approach to Service Quality model (Gupta and Singh, 2017)

The following section ‘critical appraisal’ aims to develop linkages between the above mentioned models, followed by carrying out their evaluation against select features collected from literature.

4. Linkages among Models and Critical Appraisal

In the Indian setting, akin to literature in developed nations, the development of various measures of service quality has been sequential. The select models seem to have learnt from the observations of predecessor models and carried out amendments. A number of these models are conceptual, whereas other are empirical and application based.

Though the concept of excellence in services took roots in late 90s when Indian industrial economy faced challenges imposed due to Liberalization and in that backdrop. Sinha and Babu (1998) (SQ 01) postulated the concept of Depot service Index (DSI) model to serve customers in a better manner. Madhukar *et al.* (1999) (SQ 02) advocated the needs for Indian



banks to ‘change’ their customer service strategies to serve them like European or U.S. banking institutions. Sinha and Ghosal (1999) (SQ 03) noted that ‘manufactured products got entwined with services, to the extent of becoming Indistinguishable’ and summarized that “... best service will win all the marbles – because you can’t keep an advantage in other areas for long”.

However, by the turn of 21st century, the concept was shaped better by Sureshchander *et al.* (2001) who presented a holistic model to measure Total Quality Service (TQS). They identified 12 determinants of service quality and also checked the model for reliability and validity. In the same vein, Banwet and Datta (2002) (SQ 05) conducted a longitudinal study over a period of six months to develop LIBQUAL instrument by collecting data from visitors to library services. Malhotra *et al.* (2005) (SQ 06) compared SERVQUAL attributes for three countries namely, India, U.S. and Philippines to conclude that the results for the U.S. were significantly different from those for India and the Philippines. In the same year, Banerji *et al.* (2005) (SQ 07) compared SERVQUAL model in a number of service sector industries and recommended quality management methods which could be more effective in emerging economies. Mukharjee and Nath (2005) (SQ08) contributed by evaluating the construct by using alternative tools like modified gap model, TOPSIS and Loss function from consumers of banking services and identified Gap model as the simplistic approach.

The applicability of service quality studies in manufacturing sector started with pioneering work by Seth *et al.* (2006) (SQ 09) which provided a practical framework for service quality improvements to advantage across the supply chain as a sustained growth differentiation strategy. Mahapatra and Khan (2007) (SQ 10) proposed Edu-QUAL model of Service Quality to ensure satisfaction of various stakeholders from education system. In a similar manner, Palani Raja *et al.* (2007) (SQ 11) developed a Healthcare Service Quality model by synthesizing factors from selection criteria for three quality awards for assessing health care processes quality status. Ghosh & Srivastava (2009) (SQ 12) measured customer’s perception of service quality dimensions and extended the consequences to study commitment, and trust in Indian banking sector. Kelkar (2010) (SQ 13) developed a new scale labeled SERVDIV by picking a code of conduct called “*Atithi Devo Bhavah* (Customer is God)” from an ancient Indian scripture, ‘Atharva Veda’. Service Quality in insurance services is studied in two models by Siddiqui and Sharma (2010) (SQ 14); and Prakash *et al.* (2011) (SQ 15). Whereas Siddiqui and Sharma (2010) (SQ 14) checked only ensured face validity of the responses collected, Prakash *et al.*, (2011) (SQ 15) adequately checked the model for all types of validity. Prakash (2011) (SQ 16) synthesized various models to study the impact of service quality attributes on loyalty and competitive advantage in the large scale Indian automotive units.

As part of latest stage models, Mukhopadhyay and Chatterjee (2012) (SQ 17) examined and assessed the adequacy of existing service quality literature and its application to those different types of e-Governance services. Gupta and Datta (2012) (SQ 18) suggested a distinct two-step methodology for assessing the infrastructural services provided at Indian Railway stations, at attribute level and at component level. Jain *et al.* (2013) (SQ 19) evaluated service quality in Technical education and presented a reliable and valid hierarchical structural model. Sharma and Kaushal (2014) (SQ 20) developed a scale to measure service quality in management education and identified five dimensions viz., teaching, co-operation & support, facilities, convenient and reliability. Das and Pandit (2015)

(SQ 21) developed a method to determine the transit service delivery levels using the concept of users' and potential users' minimum acceptable service and desired service level. It is suggested, based on the availability of resources, service providers need to prioritize certain service areas for immediate improvement. Jain & Jain (2015) (SQ 22) developed a structural model of relationships of functional and outcome quality with overall service quality tested through use of the structural equation modeling (SEM) approach. Pandit and Balyan (2016) (SQ 23) studied the impact of Service Quality on Customer satisfaction, loyalty, commitment and retention in the Indian Banking Sector. Gupta & Singh (2017) (SQ 24) developed a system approach by identifying five drivers of a two-wheeler manufacturer supply chain namely- supplier, organization, distributor, retailer and customer using diagraph approach. They further measured overall supply chain index value using ANN approach.

It comes out from the review that:

- i. There is neither a universally-accepted definition of service quality construct, and nor there is any generally accepted standardized yardstick to measure its value.
- ii. However, most of the above models evaluate service quality either by comparing the customer's expectations with their respective perceptions or by service experience (perceptions) only. The summary evaluations of these models in respect of their findings and weaknesses are presented in the following table 1:

Table 1: Summary of select service quality studies in India.

Model No.	Key Findings	Limitations
SQ 01 (Sinha and Babu, 1998) Consumer service Index model	<ul style="list-style-type: none"> • Developed DSI (Depot Service Index) for measuring quality of customer service. • Data taken from fast moving consumer goods company of India. • Helped to improve quality of service by primarily bringing about improvements in supply chain performance. 	<ul style="list-style-type: none"> • Antecedents of customer satisfaction are not investigated. • A generalized standard scale is not provided, thus the model cannot be emulated in different service situations.
SQ 02 (Madhukar et al., 1999) Retail Bank service quality model	<ul style="list-style-type: none"> • Assessed service quality of customers in banks. • SERVQUAL (Parasuraman et al., 1988) provides greater diagnostic information than SERVPERF (Cronin & Taylor, 1992). • Challenged the five-factor conceptualization of SERVQUAL since it does not seem to be totally applicable. 	<ul style="list-style-type: none"> • It does not evaluate the implications of the service quality scales in terms of prescribing the best marketing stimuli for bank marketing in India.
SQ 03 (Sinha & Ghosal, 1999) Gap model in steel Industry	<ul style="list-style-type: none"> • Presented a strategy for achieving strategic advantage through customer service. • Based on case of Indian steel industry. • The concept can be extrapolated for any developing economy. 	<ul style="list-style-type: none"> • The model does not bring out attributes of service quality. • Guides steel market to respond to the rising expectations of the customers.
SQ 04 (Sureshchander et al., 2001) Total Quality Service (TQS) model	<ul style="list-style-type: none"> • Presents a holistic model to measure Total Quality Service (TQS). • Identifies 12 service quality attributes. • Checked the model for reliability and validity. 	<ul style="list-style-type: none"> • Structural model has not been presented. • A generalized standard scale is not provided, thus the model cannot be emulated in different service situations.
SQ 05 (Banwet & Datta, 2002)	<ul style="list-style-type: none"> • Studied the effect of service quality on post visit intentions of visitors to library services over a period of 6 months. 	<ul style="list-style-type: none"> • Structural model has not been presented. • The study has been carried in a

Lib-Qual Model	<ul style="list-style-type: none"> • Service quality and satisfaction levels modify over time. • The outcome dimension of service performance was more strongly predictive of service satisfaction than tangible and intangible dimensions of service quality. 	typical library system; the model cannot be extended in other service situations.
SQ 06 (Malhotra <i>et al.</i> , 2005) Multi-country Cross-culture model	<ul style="list-style-type: none"> • Compared service quality dimensions as proposed by Parasuraman <i>et al.</i> (1985) for three countries namely USA, India and Philippines. • The results for the USA were systematically and significantly different from those for India and the Philippines in the predicted direction. 	<ul style="list-style-type: none"> • Only one service sector, i.e. banking was examined. • In comparing developed with developing economies, the primary basis of empirical comparison was limited to the level of economic development. Other cultural dimensions should also be considered.
SQ 07 (Banerji <i>et al.</i> , 2005) Service sector SERVQUAL Model	<ul style="list-style-type: none"> • Made a comparison of quality management methods in variety of service sector industries. • This study begins to shed light on the quality management methods that seem to be effective in emerging economies. 	<ul style="list-style-type: none"> • Structural model has not been presented. • The model cannot be extrapolated in different service situations.
SQ 08 (Mukharjee and Nath, 2005) Comparative approaches to service quality measurement	<ul style="list-style-type: none"> • Assessed service quality with three approaches viz. Modified Gap model, TOPSIS and Loss function. • It offers managers with a framework of service quality improvement that measures service quality gaps, selects an optimal combination of attributes levels to deliver customer satisfaction, and focuses on reducing the future loss caused by poor quality. • Gap model is simplistic approach to measure service quality. 	<ul style="list-style-type: none"> • Recommends multiple methods approach to service quality measurement which is not simple to be incorporated. • Doesn't propose one concrete solution.
SQ 09 (Seth <i>et al.</i> , 2006b) Service Quality in Supply Chains	<ul style="list-style-type: none"> • This research offers managers with a practical framework for service quality improvements that measures service quality. • The work suggests the ways to achieve customer satisfactions and focuses on sustained growth differentiation strategy for supply chain. 	<ul style="list-style-type: none"> • Environmental factors are not considered in study. • The items linking to organization's strategy are not included in this framework.
SQ 10 (Mahapatra and Khan (2007) Edu-QUAL model of Service Quality	<ul style="list-style-type: none"> • Since the requirements of various stakeholders from education system were found to be different, "a common minimum quality items suitable to all stakeholders" were identified to develop a scale and improve customer satisfaction. • This led to the development of Edu-QUAL for using neural networks for evaluating service quality for each stakeholder. 	<ul style="list-style-type: none"> • Upon sensitivity analysis, the model was not found to be enough robust.
SQ 11 (Palani Raja <i>et al.</i> (2007) Healthcare Service Quality model	<ul style="list-style-type: none"> • This research compares criteria of selection for three quality awards for assessing healthcare processes quality status in private sector institutions. • Identified factors to measure the quality perceptions of healthcare organizations and developed a healthcare service quality scale. 	<ul style="list-style-type: none"> • The study is confined to private health care institutions and can't be extrapolated for government run institutions. • Since the study was confined to one geographical region, it cannot be assumed that the results are relevant more broadly.

SQ 12 Ghosh and Srivastava (2009) Commitment and Trust based Service Quality model	<ul style="list-style-type: none"> The major contribution of the study was the identification and measurement of customer's perception of service quality dimensions and their relative importance for increasing loyalty, commitment, and trust. They organization pay attention to these variables to strengthen competitiveness in an extremely competitive market. 	<ul style="list-style-type: none"> Other variables like pricing, technology, logistics etc. should have been considered in study. A relatively sample size was used. Findings are not generalizable.
SQ 13 Kelkar (2010) SERVDIV model	<ul style="list-style-type: none"> Kelkar (2010) developed a new scale labeled SERVDIV by taking cues from ancient Indian scripture Atharva Veda guideline, "Guest is divine (Customer is the king)" The three attributes suggested to "serve (worship) the divine guest (customer) are through the paths of knowledge, action and submission". 	<ul style="list-style-type: none"> The model states a hypothetical proposition only. No statistical analysis is carried out.
SQ 14 Siddiqui and Sharma (2010) Gap Model of service quality in Life Insurance Industry	<ul style="list-style-type: none"> The study highlights inefficient and non-productive use of resources in Indian Insurance sector. The PZB (1988) gap model is checked for reliability but is not found to be a valid instrument for assessing perceived service quality in the select sector. 	<ul style="list-style-type: none"> This study does not involve the causal relationship between service quality, customer satisfaction, loyalty and retention.
SQ 15 Prakash et al., (2011) Service quality model for Life Insurance Business	<ul style="list-style-type: none"> The model is developed using ANN approach and has been adequately validated for all stakeholders in the service network. The study reveals that best-fit model does not contain the construct of patronage intention, which means. This conclusion challenges the traditional viewpoints prevailing in this sector. 	<ul style="list-style-type: none"> This convenience sampling and anonymous survey-based research pose limitations to results of this model. Single service industry has been surveyed for conducting the study.
SQ 16 Prakash (2011) Service Quality in Automotive Industry	<ul style="list-style-type: none"> The models endorses the conclusions drawn by Seth <i>et al.</i> (2006) in the supply chains of three select large scale automobile organizations. It models both intrinsic and extrinsic service quality at different dyads of supply chain and develops linkages between the two. The study proposes complete structural model with loyalty, competitive advantage and unit's performance used as outcome variables. 	<ul style="list-style-type: none"> Only three automotive units under study and snowball sampling method diminish generalizability of the findings. The research doesn't consider technical quality attributes into consideration.
SQ 17 Mukhopadhyay and Chatterjee (2012) E-Governance Model	<ul style="list-style-type: none"> Assessed whether there is a need to classify e-Governance services and developed separate approaches to service quality assessment. Examined and assessed the adequacy of existing service quality literature and its application to those different types of e-Governance services. 	<ul style="list-style-type: none"> The findings are snapshots of situations that continue to evolve. The study is confined to a single state, and thus may not represent all the implementation across the nation.
SQ 18 Gupta and Datta (2012) Service quality at Indian railway stations	<ul style="list-style-type: none"> This research suggests a distinct two-step methodology for assessing the infrastructural services provided at Indian Railway stations, at attribute level and at component level. Responses collected for importance and satisfaction on attributes in five point rating scale is converted to interval scale for obtaining mean values and corresponding intervals or level for different passenger groups. Law of Categorical Judgment has been used for scale conversion. 	<ul style="list-style-type: none"> The results obtained for Indian railway stations may not be of relevance if the cultural and socio-economic background of people is different from that in India. The methodology is not fully validated.

<p>SQ 19 Jain et al. (2013) Service Quality in Technical Education</p>	<ul style="list-style-type: none"> The study evaluates service quality at an overall level, a dimensional level, and at a sub-dimensional level. The proposed hierarchical structure of the service quality model fills the gaps that exist in the conceptualization of service quality in technical education. The scale developed can be used by management as a benchmark for differentiating service delivery. 	<ul style="list-style-type: none"> The use of judgmental sampling technique is a limitation of the study. The generalization of the model in a global scenario is not possible.
<p>SQ 20 Sharma and Kaushal (2014) Service quality in Management education</p>	<ul style="list-style-type: none"> Five dimensions viz., teaching, co-operation & support, facilities, convenient and reliability are identified based on principal component factor analysis. This result shows that students are satisfied with quality service on dimensions like teachings, convenient, facilities, and cooperation but least satisfied with the dimension reliability. The empirical findings enables the management institutes to develop a monitoring system for management education. 	<ul style="list-style-type: none"> The results obtained from this study cannot be generalized to a wide range. Perceptions of service quality from stakeholders other than students were not collected. The results are limited by the validity and reliability of the survey instrument and the time frame of data collection.
<p>SQ 21 Das and Pandit (2015) Bus Service Quality Model</p>	<ul style="list-style-type: none"> In this research, a method has been developed to determine the transit service delivery levels using the concept of users' and potential users' minimum acceptable service and desired service level. It is suggested, based on the availability of resources, service providers need to prioritize certain service areas for immediate improvement. 	<ul style="list-style-type: none"> The users' perceived service levels which may differ from the actual service levels. Ordered categorical scales limited the use of 'median' only to aggregate the results.
<p>SQ 22 Jain and Jain (2015) Outcome Service Quality model</p>	<ul style="list-style-type: none"> The data used in the study are based on a survey of bank customers located in Delhi region. A structural model of relationships of functional and outcome quality with overall service quality was tested through use of SEM. The study finds outcome quality as being a significant and major determinant of customer service quality perceptions in banks. 	<ul style="list-style-type: none"> The Use of a two-item scale does put at stake the generalizability of the study findings in respect of outcome quality. The nomological validity of the functional as well as outcome quality scales is not checked.
<p>SQ 23 Pandit and Balyan (2016) Service quality in Indian banks</p>	<ul style="list-style-type: none"> An attempt was made to establish bridges between the factors of service quality and customer satisfaction, retention, loyalty and commitment in Indian Banking Sector. Confirmatory Factor Analysis was used to validate the model. 	<ul style="list-style-type: none"> Generalization of the study is restricted under assumptions. Respondents' error may subsist in the study.
<p>SQ 24 Gupta and Singh (2017) System Approach to Service Quality Model</p>	<ul style="list-style-type: none"> The study considered five drivers of a two-wheeler manufacturer supply chain namely, supplier, organization, distributor, retailer and customer. A model was developed which depicts the relations between all these drivers using GTA. The study extended the earlier model by relating service quality of five drivers with customer satisfaction and customer loyalty using ANN. 	<ul style="list-style-type: none"> This study used survey method and is restricted to North India, whereas the application of this methodology in other regions may change the result predicted by this study. Structural model is not prepared.

5. Discussion & Findings

It comes out from the above review that service quality models have been developed with respect to situation/sector under consideration with desirable modifications incorporated as learning from previous studies/or remodeling and finally testing the findings.

We find that the methodology adopted in these models have been, the Structural Equation Modelling, ANN, AHP, Multiple Regression, ANOVA, GTA with SEM being most widely applied. Most of the latest studies have included the dimensionality of service quality besides the multidimensional hierarchical structure of service quality. Some aspects are explained as below for enhanced perceptible about service quality characteristics. The salient learning points are summarized as follows:

- i. Most of the recent authors have admitted service quality as a hierarchical construct comprising various sub-dimensions. Future research could extend scholarly understanding of service quality by undertaking empirical studies of hierarchical multidimensional conceptions of service quality in different settings.
- ii. However, the number and nature of the dimensions varied, depending on the service context; indeed, they varied even within the same service industry. Scholars should therefore describe the empirical context in which a particular factor was developed and the context in which it can be applied. Future studies should replicate these measure in different context to ascertain whether the number and nature of dimensions are applicable in other settings.
- iii. Very few studies have attempted applicability of model posited by them for a variety of other services or to serve as the generic model/benchmark for different service contexts.
- iv. The business environment has changed dramatically over the past decade, leading to the need for greater adaptability and flexibility found with very few studies only through arguments where they have not used and applied simulation.
- v. All studies on service quality have provided the direction for improvements that imply the core of the service quality modeling focus on an argument based service improvement priorities that are most important.
- vi. Many researchers have attempted to establish linkages of service quality with satisfaction and customer loyalty leading to trust and commitment. Some studies have attempted to formulate its relation to the overall performance/competitive advantage of firm/service-provider unit.
- vii. The use of IT and e-commerce has become predominant, as indicated by many researches.
- viii. Consideration of internal service quality issues has been continuously increasing.
- ix. Artificial intelligence approach using neural networks have been tried in service quality to model complex relationships between inputs and outputs.

- x. Multiple stakeholders in supply chains have different background and varied behavioral patterns. The service quality items may be likely to differ among stakeholders, but the attempt can be made to bring out a standardized construct, (with items capturing it) that fulfills the requirement of all the stakeholders of supply/value chain.
- xi. Though most of the service quality studies have reported factors using Exploratory factor Analysis followed by Confirmatory Factors Analysis, a few have attempted to apply SEM in totality for empirical validation of the developed multiple-item scale.
- xii. Most of the service quality models can be used as a criteria for benchmarking provided the quantitative measures are agreed and applied. However, none of the studies have used Monte Carlo simulation to identify key drivers.

Based on critical appraisal made in previous section, following issues/ aspects seem befitting to carry out a relative comparative evaluation of the service quality models (Prakash *et al.*, 2011; Seth *et al.*, 2006a):

- A. Hierarchical structure comprising first and second-order determinants
- B. Identification of attributes to capture service quality
- C. Applicability for different services/goods produced by the service provider unit/firm
- D. Flexibility as per change in customer's perceptions/expectations
- E. Directions for enhancing service quality
- F. Establishing linkage with customer satisfaction/loyalty
- G. Indicates the need for imparting training/skills to service delivery personnel
- H. Flexibility to accommodate modification as per the changes in conditions
- I. Focus upon both upstream and downstream partners
- J. Identifies the need for better resource utilization or development of infrastructure
- K. Usage of ICT in services
- L. Use of Artificial Neural Networks (ANN)
- M. Collects multiple expectations from customers
- N. Ability to serve as a criteria for benchmarking
- O. Reporting of the Exploratory Factor Analysis
- P. Sound theoretical background
- Q. Development of measurement model
- R. Suitable selection of scale
- S. Presentation of the structural model
- T. Depiction of model modification process
- U. Showing path coefficient in the best structural model
- V. Use of the second-order structure model
- W. Use of Monte Carlo simulation to identify key drivers
- X. Applicability to manufacturing sector
- Y. Utility in managing operations across the Supply Chain
- Z. Validity for SMEs

Table 2 presents an attempt to compare and contrast the models against above-mentioned parameters A-Z.

Table 2: Comparison of service quality models against select parameters

Year	1998	1999	1999	2001	2002	2005	2005	2005	2006	2007	2007	2009	2010	2010	2011	2011	2012	2012	2013	2014	2015	2015	2016	2017
Issue #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A					✓	✓			✓	✓	✓	✓		✓	✓		✓	✓	✓			✓	✓	✓
B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C			✓				✓	✓	✓			✓	✓		✓	✓	✓		✓			✓		✓
D									✓	✓		✓	✓		✓	✓	✓		✓					
E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F		✓				✓	✓		✓			✓			✓		✓	✓	✓			✓		✓
G		✓				✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓
H										✓		✓								✓		✓	✓	✓
I										✓					✓		✓	✓			✓			✓
J			✓				✓			✓		✓			✓		✓	✓	✓	✓	✓		✓	✓
K		✓			✓	✓			✓	✓	✓	✓			✓		✓		✓			✓	✓	✓
L										✓					✓		✓					✓		✓
M							✓			✓		✓			✓		✓	✓	✓					
N								✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓
O							✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
P			✓	✓	✓	✓	✓		✓		✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	
Q									✓		✓	✓	✓		✓	✓	✓	✓	✓			✓	✓	
R					✓			✓			✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓
S									✓			✓			✓		✓	✓	✓			✓		✓
T									✓		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	
U												✓			✓		✓		✓					✓
V									✓			✓			✓		✓		✓					✓
W																								✓
X												✓	✓		✓	✓	✓							✓
Y	✓											✓	✓		✓	✓	✓				✓		✓	✓
Z												✓	✓			✓								



6. Conclusions

This paper makes an effort to provide a bird's eye view of the 24 significant models of service quality developed in Indian setting since the inception of concept in 1998. After reviewing these models, it may be noticed that

- i. Despite the changes already incorporated, there is still a need to make further modifications in the service delivery processes along the whole supply/value chain.
- ii. There has been considerable changes in the expectations of the users/clients over the period of evolution of these models and development of service quality concept.
- iii. The above measures were designed and developed in Indian culture and may be extrapolated in 'emerging economies' under certain assumptions.
- iv. No reliable universal yardstick has yet been established for the objective measurement of service quality.

In a nutshell, it is acknowledged that service quality is a multidimensional and hierarchical construct characterized by multiple stakeholders in the supply/service-profit chain.

References

1. Banerji, K., Fundersen, D.E. & Behar, R.S. (2005). Quality management practices in Indian service firms. *Total Quality Management and Business Excellence*. 16(3), 321-330.
2. Banwet, D.K. & Datta, B. (2002). Effect of service quality on post-visit intentions over time: the case of a library. *Total Quality Management*. 13(4), 537-547.
3. Cronin, J.J. and Taylor, S.A. (1992). Measuring service quality: a reexamination and extension. *Journal of Marketing*, Vol. 6, July, pp. 55-68.
4. Das, Shreya & Pandit, Debapratim (2014). Determination of Level-of-Service scale values for quantitative bus transit service attributes based on user perception. *Transportmetrica A: Transport Science*. 11(1), 1-21.
5. Ghosh Hazra, S. & Srivastava, K.B.L. (2009). Impact of Service Quality on Customer Loyalty, Commitment and Trust in the Indian Banking Sector. *The ICAI University Journal of Marketing Management*, 8(3/4), 74-95.
6. Grönroos, C. (1993). Toward a Third Phase in Service Quality Research: Challenges and Future Directions. *Advances in Services Marketing and Management*, 2, 49-64.
7. Gummesson, E. (1992). Quality dimensions what to measure in service organizations. in Swartz, T.A., Bowen, D.E. and Brown, S.W. (eds.) *Advances in Service Marketing and Management*, Greenwich, CT: JAI.
8. Gupta, S. & Datta, R.N. (2012). Prioritizing Service Attributes for Quality Up-gradation of Indian Railway Stations. *The TQM Journal*. 24(2), 167-180.
9. Gupta, T.K. & Singh, V. (2015). A systematic approach to evaluate supply chain management environment index using graph theoretic approach. *International Journal of Logistics System and Management*, 21(1), 1-45.
10. Gupta, T.K. and Singh, V. (2017). Measurement of service quality of automobile organisation by artificial neural network". *Int. J. Management Concepts and Philosophy*, 10 (1), 32-53.
11. IEEE Case workshop (2009). *Multi-disciplinary perspective of Service Quality IBM Corporation*. August 29.
12. Jain R., Sahney, S. & Sinha, G., (2013). Developing a scale to measure students' perception of service quality in the Indian context. *The TQM Journal*, 25(3), 276-294.
13. Jain, Sonali & Jain, Sanjay K. (2015). Does outcome quality matter? An investigation in the context of banking services in an emerging market. *Journal of Consumer Marketing*, 32(5), 341-355.



14. Kelkar, M. (2010). SERVDIV: A Vedic approach to measurement of service quality. *Services Marketing Quarterly*, 31(4), 420-433.
15. Madhukar, G.A., Nataraajan, R., & Jehera, J.S. Jr. (1999). Service quality in the banking industry: an assessment in a developing economy. *International Journal of Bank Marketing*, 17(3), 116-125.
16. Mahapatra, S.S. & Khan, M.S. (2007). A framework for analyzing quality in education settings. *European Journal of Engineering Education*, 32(2), 205–217.
17. Malhotra, N.K., Ulgado, F.M., Agarwal, J., Shainesh, G. & Wu L. (2005). Dimensions of service quality in developed and developing economies: multi country cross-cultural comparisons. *International Marketing review*, 22(3), 256-278.
18. Mukherjee, A. & Nath, P. (2005). An empirical assessment of comparative approaches to service quality measurement. *Journal of Service Marketing*, 19(3), 174-184.
19. Mukhopadhyay, S.N. & Chatterjee, J. (2012). An Integrated Approach to Rural Digital Services Case Study on Common Service Centres in Hundred Thousand Villages of India. *International Journal of Research in Social Sciences*, 2(1), 96-121.
20. Palani Natha Raja, M., Deshmukh, S.G. & Wadhwa, Subhash (2007). Quality award dimensions: a strategic instrument for measuring health service quality. *International Journal of Health Care Quality Assurance*, 20 (5), 363-378.
21. Pandit, Richa D. & Balyan, R.K. (2016). Impact of Service Quality on Customer Satisfaction Loyalty Commitment and Retention in the Indian Banking Sector. Doctoral thesis submitted to Gujarat Technical University, Ahmedabad.
22. Parasuraman, A., Zeithaml, V.A. & Berry, L.L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing*, 49, 41-50.
23. Parasuraman, A., Zeithaml, V.A. & Berry, L.L. (1988). SERVQUAL: a multiple-item scale for measuring consumer perception of service quality. *Journal of Retailing*, 64(1), pp. 12-37.
24. Prakash A., Jha, S.K. & Kallurkar (2011). Attitudes of Indians towards Service Quality for Life Insurance in India. *International Journal of Research in Computer Application & Management*, 1(9), 57-63.
25. Prakash, G. (2011). Service quality in supply chain: Empirical evidence from Indian automotive industry. *Supply Chain Management*, 16(5), 362-378.
26. Seth, N., Deshmukh, S.G. & Vrat, P. (2006a). Service quality models: a review. *International Journal of Quality & Reliability Management*, 22(8), 913-949.
27. Seth, N., Deshmukh, S.G. & Vrat, P. (2006b). A framework for measurement of quality of service in supply chains. *Supply Chain Management: An International Journal*, 11(1), 82-94.
28. Sharma, Deepti & Kaushal, S.K. (2014). Measuring Service Quality in Management Education in select Institutions affiliated to GBTU. Doctoral thesis submitted to Department of Business Administration, University of Lucknow, Lucknow.
29. Siddiqui, M.H. & Sharma, T.G. (2010). Measuring the customer perceived service quality for life insurance services: An empirical investigation. *International Business Research*, 3(3), 171-186.
30. Singh, A.J., Thakur, B.S., Chauhan, R. & Sharma, V. (2011). Comprehensive Framework for quality Database Applications. *Research Cell: An International Journal of Engineering Sciences*, 4(Sept.), 525-534.
31. Sinha, G. & Ghoshal, T. (1999). Quality customer service: strategic advantage for the Indian steel industry. *Managing Service Quality*, 9(1), 32-39.
32. Sinha, R.K. & Babu, A. (1998). Quality of customer service in supply chain system: a diagnostic study. *International Journal of Quality & Reliability Management*, 15(8/9), 844-859.
33. Sureshchandar, G.S., Chandrasekharan Rajendran, & Anantharaman, R.N. (2001). A holistic model for total quality service. *International Journal of Service Industry Management*, 12(4), 378-412.
34. Trehan, R., Sachdeva, A. & Garg, R.K. (2014). Cost of Quality- A System Dynamics Approach. *Research Cell: An International Journal of Engineering Sciences*, 3, 230-37.

